

MONTHLY WEATHER REVIEW.

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The present summary for 1908 is based essentially upon data received from about 200 regular Weather Bureau stations, 33 regular Canadian stations, and from such climatological stations as have forwarded their annual summaries in time. The

statistical tables and charts have been prepared under the supervision of Prof. F. H. Bigelow, in charge of the Climatological Division, and the summary of flood movements by Dr. H. C. Frankenfield, Professor of Meteorology.

FORECAST DIVISION.

Prof. E. B. GARRIOTT, in charge.

WEEKLY WEATHER FORECASTS.

By Prof. E. B. GARRIOTT.

In reply to numerous inquiries regarding methods employed in the preparation of weekly weather forecasts, answer has been made that they are based upon a consideration of atmospheric pressure over the oceans and continents of the Northern Hemisphere. Details of the calculations, that rest largely upon knowledge acquired by study and experience, can not, of course, be readily furnished. In a general way, however, it may be stated that the dependence of local weather changes upon world-wide atmospheric conditions has long been recognized, and careful studies of the relation and association of the great oceanic and continental barometric areas with marked types of weather have been made. In previous years studies of this character have necessarily been made with reports received by mail. During the past year daily telegraphic reports from selected stations throughout the Northern Hemisphere have permitted an application of the knowledge derived from these studies.

In the balancing of air masses over the Northern Hemisphere is found a cause of normal and abnormal weather in various portions of the hemisphere. In winter the greater masses, which are represented by areas of high barometric pressure, occupy the continents, and in summer the oceans are the seats of the so-called permanent areas of high barometer. In the shifting of the areas is produced what may be termed an annual ebb and flow of atmospheric tides; the air currents, or prevailing winds that attend the tides, are important factors in climatic changes and conditions. Marked departures from a normal distribution of air pressure result in decided departures from seasonal weather. In the relation of normal and abnormal pressure distribution to seasonable and unseasonable weather is found the problem of forecasting for periods of one to two weeks in advance. Generally speaking the distribution of pressure that is peculiar to a certain season will produce in a modified degree the weather of that season irrespective of the time of year.

The character of the barometric distribution over the Pacific Ocean and the continent of Asia indicates the development or approach of storms and high-pressure areas that will appear on the western coasts of the North American Continent; and barometric conditions over the Atlantic Ocean and Europe indicate the direction and speed of the movements over the American Continent. Marked departures in the Asiatic area indicate the general character of the weather of the United States for a period of about two weeks in advance; and Pacific pressure conditions and changes furnish a key to weather changes that will occur on the Pacific coast of the United States three or four days in advance and indicate the character of those that will occur over the eastern portion of the United States six to seven days in advance. The strength or magnitude of the storms, cold and warm waves, and other

meteorological phenomena bear a relation to the departures from the normal pressure that appear over the oceanic and continental areas referred to.

The next advance in the forecast period will be achieved when the cause of unseasonable and unusual barometric pressures over the oceans and continents is known. If, as has been suggested, such abnormalities are due to variations in the solar radiations, the fact may be discovered when appliances for measuring the variations, if any exist, are perfected. In the meantime observed conditions and changes in world-wide pressures must form a base of operation, and facts, not theories, must be employed by the forecaster.

RIVERS AND FLOODS.

By Prof. H. C. FRANKENFIELD.

The floods of the year have been described in the various monthly issues of the MONTHLY WEATHER REVIEW. In these it can be seen that the forecast work in connection with the floods maintained its previous high character, and no flood of consequence was unheralded.

The scheme of river-stage forecasting for the Ohio River has been completed as far Louisville, Ky., and it is hoped to complete the scheme for the entire river during the year 1909.

Changes in administrative work are shown in the following summary:

NEW RIVER DISTRICT CENTERS.

Bismarck, N. Dak., with territory comprising the watershed of the Missouri River at and above Bismarck, N. Dak.
Wichita, Kans., with territory comprising that portion of the watershed of the Arkansas River from the Kansas-Colorado line to Wichita, Kans.

The territory of the Bismarck district was formerly a portion of the Sioux City, Iowa, district.

SPECIAL RIVER STATIONS OPENED DURING THE YEAR.

| Station. | District. |
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| Beaver Falls, Pa. | Pittsburg, Pa. |
| Bellota, Cal. | Sacramento, Cal. |
| Brazos, Tex. | Galveston, Tex. |
| Bridgeport, Texas. | Galveston, Tex. |
| Chamberlain, S. Dak. | Sioux City, Iowa. |
| Cochran, Ariz. | Phoenix, Ariz. |
| Edinburg, Miss. | Meridian, Miss. |
| Elliston, Ind. | Cairo, Ill. |
| Emporia, Kans. | Fort Smith, Ark. |
| Espanola, N. Mex. | Denver, Colo. |
| Estacada, Oreg. | Portland, Oreg. |
| Fort Lyons, Colo. | Denver, Colo. |
| Glendive, Mont. | Bismarck, N. Dak. |
| Grand Junction, Colo. | Denver, Colo. |
| Grand Reservoir, Ohio | Columbus, Ohio. |
| Hawkinsville, Ga. | Macon, Ga. |
| Le Roy, Kans. | Fort Smith, Ark. |
| Lewis Ferry, Tex. (P. O., New Boston.) | Shreveport, La. |
| Lewiston Reservoir, Ohio. | Columbus, Ohio. |
| Licking Reservoir, Ohio. | Columbus, Ohio. |